

IN THE CLAIMS:

1. (Previously Presented) A method of controlling the critical dimensions of a photomask substrate, comprising:

 providing a photomask substrate with a metal layer on top;
 performing a photolithographic process to form a printed pattern on said photomask substrate;
 measuring pre-etch critical dimensions of the printed pattern on said photomask substrate by an integrated measuring tool;
 providing an initial etch recipe for a metal etch process;
 modifying the etch recipe based on the pre-etch critical dimension data of said photomask substrate; performing the etch process on said photomask substrate based on the modified etch recipe to form an etched pattern on said photomask substrate; and
 measuring post-etch critical dimensions of the etched pattern.

2. (Previously Presented) The method of claim 1 further comprising;

 modifying the initial etch recipe for the next photomask substrate based on the post-etch critical dimensions data.

3. (Original) The method of claim 2 further comprising;

 determining if the pre-etch critical dimensions are within specification;
 if the pre-etch critical dimensions are within specification, sending the substrate to the next process step; and
 if the pre-etch critical dimensions are out of specification, performing rework by removing photoresist from the substrate, and re-patterning the substrate with photoresist.

4. (Original) The method of claim 2 wherein the photomask is a binary photomask.
5. (Original) The method of claim 4 wherein the metal is chromium.
6. (Original) The method of claim 2 wherein the photomask is an attenuated photomask.
7. (Original) The method of claim 6 wherein the metal is molybdenum silicide.
8. (Original) The method of claim 2 wherein the photomask is an alternate photomask.
9. (Original) The method of claim 8 wherein the metal is chromium.
10. (Previously Presented) A method of monitoring the phase shift angle of a phase shift photomask, comprising:
 - providing a photomask substrate with an etched metal layer;
 - performing a photolithographic process to form a printed pattern on the photomask substrate;
 - measuring pre-etch critical dimensions of the printed pattern on the photomask substrate by an integrated measuring tool;
 - modifying an etch recipe utilized to etch the photomask substrate based on the measured pre-etch critical dimension data;
 - etching the photomask substrate;
 - removing the remaining photoresist;
 - removing the remaining metal layer; and
 - measuring the phase shift angle and its uniformity across the substrate by the integrated measuring tool.

11. (Original) The method of claim 10 further comprising:
determining if the measured data of phase shift angle and its uniformity across the substrate are within specification;
if the measured data are within specification, the photomask process sequence is complete; and
if the measured data are out of specification, the photomask is marked out of specification.
12. (Original) The method of claim 10 wherein the phase shift mask is an alternate phase shift mask.
13. (Original) The method of claim 12 wherein the metal is chromium.
14. (Original) The method of claim 12 wherein the photomask substrate is quartz.
15. (Previously Presented) A method of monitoring the phase shift angle of a phase shift photomask, comprising:
providing a photomask substrate with a light-shielding metal layer on top of a translucent metal layer, which is deposited on the substrate;
performing a photolithographic process to form a printed pattern on the photomask substrate;
measuring pre-etch critical dimensions of the printed pattern on the photomask substrate by an integrated measuring tool;
modifying an etch recipe utilized to etch the photomask substrate based on the measured pre-etch critical dimension data;
etching the light-shielding metal layer;
removing the remaining photoresist;
etching the translucent metal layer;
removing the light-shielding metal layer; and

measuring the phase shift angle and its uniformity across the substrate by the integrated measuring tool.

16. (Original) The method of claim 15 further comprising:

determining if the measured data of phase shift angle and its uniformity across the substrate are within specification;

if the measured data are within specification, considering the photomask process sequence is complete; and

if the measured data are out of specification, marking the photomask out of specification.

17. (Original) The method of claim 15 wherein the phase shift mask is an attenuated phase shift mask.

18. (Previously Presented) The method of claim 17 wherein the translucent metal layer is molybdenum silicide.

19-24. (Cancelled)

25. (Currently Amended) A method of controlling the critical dimension of the features of a photomask substrate, comprising:

measuring pre-etch critical dimensions of features of a photomask substrate by an integrated measuring tool;

etching the features according to an etch recipe for specified critical dimensions of the features modified based on a the measured pre-etch critical dimensions of the features by an integrated measuring tool;

measuring the features to determine conformity with the specified critical dimensions by the integrated measuring tool;

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determining from the measurement the modifications of the etch recipe required to conform to the specified critical dimensions; and
etching another photomask substrate according to the modified etch recipe.